



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

40-06-04

Log Event A

Borehole Information

Farm : <u>S</u>	Tank : <u>S-106</u>	Site Number : <u>299-W23-213</u>
N-Coord : <u>36,101</u>	W-Coord : <u>75,829</u>	TOC Elevation : <u>663.00</u>
Water Level, ft :	Date Drilled : <u>6/30/1978</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>125</u>	

Borehole Notes:

This borehole was drilled in June 1978 to a depth of 130 ft. The borehole was started with an 18-ft length of 8-in. surface casing and completed to a nominal depth of 125 ft using 6-in. casing. The 5 ft of open borehole below the bottom of the 6-in. casing was filled with grout. The 18-ft length of surface casing was then removed and the annulus between the 6-in. casing and the portion of the borehole wall drilled with the 8-in. casing was grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The drilling record does not indicate if the borehole casing was perforated. The top of the casing, which is the zero reference for the SGLS, is approximately flush with the tank farm grade.

Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1996</u>	Calibration Reference : <u>GJPO-HAN-5</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>06/26/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>22.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>06/28/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>125.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>21.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Borehole

40-06-04

Log Event A

Analysis Information

Analyst : E. Larsen

Data Processing Reference : P-GJPO-1787

Analysis Date : 03/21/1997

Analysis Notes :

This borehole was logged by the SGLS in two log runs. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclide Cs-137 was detected in this borehole. The presence of Cs-137 was measured continuously from 3.5 to 4.5 ft. The measured Cs-137 concentrations inside the borehole were less than 1 pCi/g. The highest Cs-137 concentration (7.6 pCi/g) was detected at the ground surface. However, this is not an accurate concentration value because the source-to-detector geometry at the top of the borehole casing differs from source-to-detector geometry used in the calibration.

The KUT logs show a region of slightly decreased K-40 concentration values between the ground surface and a depth of about 20 ft. K-40 and Th-232 concentration values increase significantly below about 62 ft. Generally increased U-238 concentration values were detected below about 67 ft.

The change in U-238 concentration values at about 22 ft is associated with the change in log runs. This change is probably caused by radon venting up the borehole. The 609-keV spectral peak that is used to calculate the U-238 concentration is only accurate if the Bi-214 and U-238 are in secular equilibrium. Because radon gas is an intermediate member of the U-238 decay chain, the equilibrium condition will be disturbed along with changes in the weather conditions in the vicinity of the borehole. The concentration of the Rn-222 in the borehole does not necessarily remain constant between log runs.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank S-106.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.